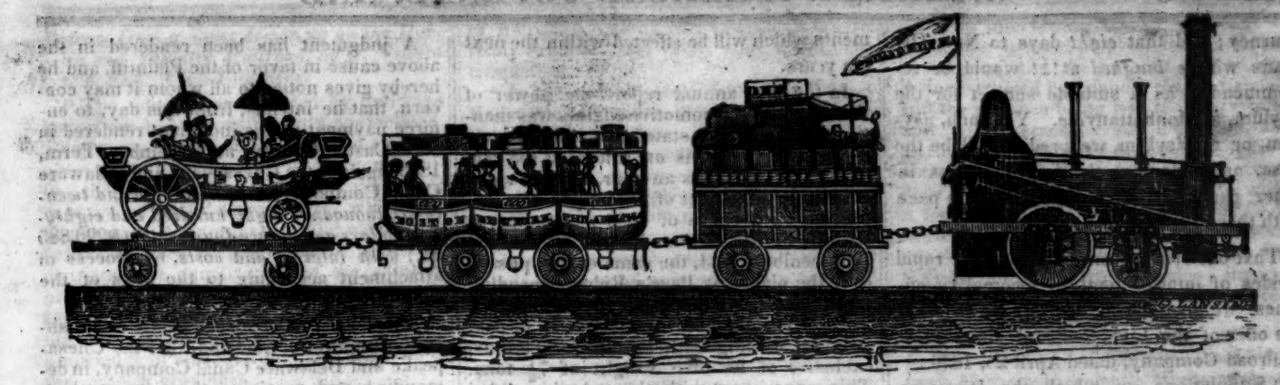


AMERICAN RAILROAD JOURNAL,
AND ADVOCATE OF INTERNAL IMPROVEMENTS.

PUBLISHED WEEKLY, AT No. 35 WALL STREET, NEW-YORK, AT THREE DOLLARS PER ANNUM, PAYABLE IN ADVANCE.

D. K. MINOR, Editor.] SATURDAY, NOVEMBER 28, 1835. [VOLUME IV.—No. 47.

CONTENTS:

Explicit Direction; Vicksburg and Jackson Railroad; Baltimore and Ohio Railroad Report.... 401
John Randel, jr. vs. The Chesapeake and Ohio Canal Company; Railroad Intelligence..... 402
Canal Intelligence..... 405
Gibbs' Improvement in Carriages and Carriage Wheels..... 406
Noble's Improvement in the Application of Steam; On the Practice of the Blow Pipe..... 407
On the Resistance of Fluids..... 408

AMERICAN RAILROAD JOURNAL.

NEW-YORK, NOVEMBER 28, 1835.

Explicit Direction.—We are amused at times at the thoughtlessness of persons in giving directions to others, for the performance of their wishes. It is not uncommon for us to receive a request to *change* the direction of the Journal, and we are always ready to do so, when we know how to do it properly; but, in order to do so correctly, it is necessary that we first know where to *stop*, and then where to *direct*, it. But we have an instance now before us, which puzzles us as much as *Patrick's* inquiry at the Post-Office, for a letter, did the P. M. Says Pat, "and have you a letter for me?" "What is your name?" says the worthy P. M. "My name is it you ask," says he, "and isn't it *on the letter* sure?" So with the person who desires us, on the margin of a paper, to send his R. R. Journal to *Mobile*, he might say, "Is not my name on your books?" Very likely; but which of the 800 names there, we are entirely unable to imagine, and therefore shall be obliged to wait for his further directions; which, we hope, will be accompanied by a five *dollar* U. S. note, for the *ensuing* year, together with all arrearages, if there be any due for the Journal; if so, he may rely upon early attention to his wishes, and our best thanks for his improved mode of giving directions.

To Bridge Builders and Railroad Contractors.—We ask the attention of our readers to the following notice from R. S. Van Rensselaer, Esq., the Engineer of the *Vicksburg and Jackson, Mississippi*, Railroad. It offers a good opportunity for a winter's campaign, and will doubtless afford a handsome profit to enterprising men.

VICKSBURG AND JACKSON RAILROAD.

Notice to Contractors.—Sealed Proposals will be received by the subscriber, at Vicksburg, from the 1st to the 10th of January next, for the grading, bridging and masonry on the eastern division of this Road, from Big Black River to the town of Jackson, a distance of 34 miles.

Three Bridges of considerable magnitude, one to be constructed over Big Black River, 200 feet between the abutments, and two over Baker's Creek, about 60 feet between the abutments, are jobs well deserving the attention of experienced contractors.

Proposals will also be received, at the same time, for putting down the superstructure on the western division, extending from the Mississippi, at Vicksburg, to Big Black River, a distance of 12 miles.

Individuals disposed to contract for the execution of the whole, or any part of this work, will be required to furnish certificates of qualifications and character, unless personally known to the subscriber.

Plans and profiles of the line, and drawings of the different constructions on it, may be seen, and all necessary information obtained, by applying at the Engineer's Office, in Vicksburg, between the 20th December and the time for letting.

R. S. Van Rensselaer, Civil Engineer.

Vicksburg, November 2nd, 1835.

Baltimore and Ohio Railroad Report.—We acknowledge the favor, by the President of the Company, of a copy of the *ninth* annual Report of the Baltimore and Ohio Railroad Co.; and cannot refrain from here expressing our own, and we believe we do not say too much when we say the, thanks of the whole *Railroad* community, as well in *Europe* as in America, for the candid, business-like and liberal manner in which they annually lay before the world the result of their experience.

It will not be saying too much, we are sure, to denominate them the *Railroad University* of the United States. They have labored long, at great cost, and with a diligence which is worthy of all praise, in the cause; and what is equally to their credit, they have published annually the result of their experiments, and distributed their reports with a liberal hand that the world might be cautioned by their errors and instructed by their discoveries. Their reports have in truth gone forth as a text book, and their road and workshops have been as a lecture room to thousands who are now practising, and improving upon their experience. This country owes to the enterprise, public spirit, and perseverance, of the citizens of Baltimore, a debt of gratitude of no ordinary magnitude; as will be seen by the following extract from the President's Report, in relation to their improvements upon, and performances with, their locomotive engines, when compared with the performances of the most powerful engines in use, or rather in *imagination*, in 1829, only *six* years ago.

If such are the results and improvements of one Company in the short space of *six* years, when so few comparatively have participated in the subject of Railroads, what, we would ask, will they not be within the next *ten* years, when Railroads shall become, as they are now certainly becoming, the most extensive, and the most important branch of business of the country? Who dare predict, or hazard a conjecture, as to the improvements upon those now in use? We need not say that he who should hazard any thing like the following, viz. that before the 4th of July 1845, it will be considered *no great performance to leave New-York at sunrise, transact business in Albany, return again to New-York before the setting of the sun;* or that the mail will be transported from this city to Lake Erie in *twenty-four hours*, delivering and receiving mails at every principal village on the route—or that the distance from this city to Boston, and to Washington City, will be only a nine, or at the extent, *ten* hours

journey; and that *eight* days to New Orleans will be *laughed* at!!! would be recommended as a suitable subject for the asylum, at Manhattanville. Yet such, asylum, or no asylum, we predict will be the case, and also that the improvements in other parts of the country will keep pace with these great thoroughfares.

That our readers may perceive the rapid strides of improvement in locomotive engines, we give the following extract from the offer of the Liverpool and Manchester Railroad Company, dated April 25, 1829:

"Stipulations on which the Directors offer a premium of 500*l.* for the *most improved Locomotive Engine*."

"The said engine, if it weighs six tons, must be capable of drawing after it, day by day, on a well constructed Railway on a plane, a train of carriages of the gross weight of *twenty tons, including the tender and water tank*, at the rate of *ten miles per hour*."

Here we have the very best evidence of the extent of the views of intelligent men, in 1829; men whose reputation and interest were at stake, and who would, therefore, have been like to require all that they could anticipate, viz. 20 *tons on a level road at ten miles per hour*, and they truly required wonders; but such has been the influence brought to bear upon the subject, that in 1834 the Baltimore and Ohio Company constructed an engine which took 112 tons on a level at the rate of 12 miles per hour, and up an inclination 17 feet per mile on a curve with a radius of only 1000 feet, at the rate of 6¼ miles an hour; and which also passed a plane of two thirds of a mile in length, and 264 feet per mile ascent, with eleven tons, exclusive of the engine of 7½ tons—and in 1835 another engine belonging to the same company took a load of 113 tons 30½ miles at the average speed of 12 miles per hour, overcoming grades of twenty feet per mile for six consecutive miles with ease, which is at least equal to 213 tons at 10 miles an hour on a level road! or more than ten times the requirements of the Liverpool and Manchester Road, in 1829. The following extract is from the ninth annual Report of the Baltimore and Ohio Company, and will sustain us in our assertion that this community owe them a debt of gratitude not to be estimated; which will be paid, however, by using the information thus obtained to construct other Roads to compete with them for the business, and to draw the trade and travel to the northern and southern cities. Much more might be said by way of illustration of the benefits conferred upon mankind by the operations of this Company; but we shall give the main part of this valuable document in the Journal hereafter—for the present we ask our readers to compare the state of improvements in 1829 and 1835, and then to imagine, if possible, the extent of the improvements which will be effected within the next ten years.

In the last annual report, the power of the "Arabian" locomotive engine, was mentioned; and it was stated that it had drawn upwards of 112 tons on a level at the rate of near twelve miles an hour, and the same weight up an ascent of 17 feet per mile, occurring on a curve of 1000 feet radius, at the rate of 6¼ miles an hour. Afterwards, in December, 1834, the same engine passed over the planes at Parr's Ridge, ascending two-thirds of a mile at the average rate of 264 feet per mile, with two cars full of passengers, making with the tender 11 tons, exclusive of its own weight of 7½ tons. This experiment with the "Arabian," led the Board to consider the propriety of relocating the Road at the planes, as already mentioned, so as to dispense with the use of stationary or horse power there.

The "Arabian" was the first engine built after the adoption of the present plan. It is now in daily use, travelling 80 miles without slacking its fires, or letting its steam get down, and is in perfect order. There are five other engines like it, on the road, and three more will, in a short time, be completed, and ready for use.

On the 26th of September last, a load amounting to 113 tons, was attached to the "Washington," a new engine on the plan of the Arabian, weighing eight tons, with a view of making an experiment of the effective power of the Company's engines on the Branch Road. With this great weight, the engine travelled to the city of Washington at a rate, not less, at any place, than ten miles an hour, preserving this, the least speed, up ascents, of five and six miles in length, of twenty feet to the mile. The train was several times purposely stopped on the ascending grades, and when the steam was again applied, the engine would steadily regain its previous velocity, and maintain it with apparent ease. The same load was brought from Washington to Baltimore at the same rate. The *average* speed was much greater, and upon the level parts of the road, seemed entirely at the discretion of the engineer. The same engine, on a level, exerting the same power, would have drawn 213 tons at the rate of ten miles an hour. During the whole time there was a superabundance of steam. Performances like this, are, it is believed, unequalled in the history of Railroads.

JOHN RANDEL, jr. *vs.* THE CHESAPEAKE AND DELAWARE CANAL COMPANY.—By the following notice we perceive that the long contested suit of Mr. Randel against this Company is at length decided, and that Mr. Randel is, to all intents and purposes, entitled to the entire income of the Canal, until his judgment is satisfied.

In this controversy, Mr. R. has contended against great odds, but, with justice, equity, and law, all on his side, he has at length succeeded, and will eventually be remunerated for his losses of money, but not for his loss of time, nor the perplexity necessarily attendant upon a ten years' litigation.

John Randel, jr., vs. Garnishees of the Chesapeake & Delaware Canal Company. } In the High Court of Errors and Appeals of the State of Delaware,—attachment fieri facias, on judgment upon Case stated.

A judgment has been rendered in the above cause in favor of the Plaintiff, and he hereby gives notice to all whom it may concern, that he intends, from this day, to enforce payment of his judgment rendered in New-Castle County, at December Term, 1833, against the Chesapeake and Delaware Canal Company, for *two hundred and twenty-six thousand, eight hundred and eighty-five dollars and eighty-four cents*, ($226,885 84,) *with interest and costs*, by process of attachment according to the laws of the State of Delaware.

The decision above referred to, establishes the important question, that the Chesapeake and Delaware Canal Company, in demanding and receiving the tolls attached, acted in contravention of the law. Whether it will be the pleasure of this Corporation, further to set at defiance the declared law of the land, by extorting the payment of tolls which may be hereafter attached, time will unfold.

The undersigned regrets exceedingly, that, by the refusal of the Chesapeake and Delaware Canal Company to satisfy his just claim, after a tedious, expensive, and protracted litigation of nearly *ten years*, he should be compelled to resort to measures which, in their execution, may be convenient to those who may navigate the Canal, but this measure has been forced upon him by the conduct of the Canal Company. It is his intention, however, to give as little trouble to those who may become indebted for tolls to the Canal Company, as may be consistent with the enforcement of his just rights. JOHN RANDEL, jr.

New-Castle, Del., October 31st, 1835.

RAILROAD INTELLIGENCE.

We commence in this number, what we hope to be able to continue, regularly hereafter, a summary of the movements, in different parts of the country, in relation to Railroads and Canals. Heretofore other avocations have rendered it impracticable.

We shall probably be able, also, to give some interesting information in relation to the various Railroads in *use*, and in course of construction in Europe.

We commence to-day by giving from the *London Railway Magazine*, (a small work of 28 pages monthly, at 6*s.* sterling a year) an interesting communication from Mr. Vignoles.

It will be seen that Mr. Vignoles puts down the Railroads in use in Great Britain at nearly 250 miles; and those in course of construction at 400 miles, whilst we have in this country at least 800 miles of road in use, and near 2000 miles more commenced and in rapid course of construction; and what is of still more interest, there will be 1000 miles in addition to the above *commenced* before next Spring.

It is indeed true, as Mr. Vignoles observes, "that it is in the *United States where the great impulse is given to Railroads*," and it is equally true, as he further remarks, that "*Railways create their own resources of revenue.*"

We ask the attention of our readers to the following:

Extract from a paper drawn up on the Dublin and Valentia Railroad, by C. VIGNOLES, Esq., *Civil Engineer.*

"The advantages afforded by Railways have now become sufficiently appreciated. They comprise the civilization and employment of the laboring part of the community; the distribution throughout the whole country of useful expenditure, which the localization of manufacture and capital has before secured in monopoly to particular districts; the equalization of the value of property, and more especially rapidity and economy of communication, thereby affording the means of obtaining an intimate knowledge of all the wants and interests of the remoter provinces.

"Consequent on the appreciation of these objects has been the progress of the Railway system throughout Europe and the United States.

"In Great Britain, the successful experiment between Liverpool and Manchester gave birth to numerous projects, of which some have been already accomplished; and there are now in profitable operation nearly 250 miles of Railway* in various parts of that country.

"Within three years the Railway from London to Liverpool will be completed, besides various other great connecting lines, altogether 400 miles† of Railway, are at this time in progress of construction in England alone. Applications for 200 miles,‡ including the Bristol line, are before Parliament; and companies are now forming for upwards of 500 miles,§ among which is the connexion between Glasgow and Edinburgh, and between York and London; in all, nearly 1400 miles.

"In Belgium, the first portion of the chain of Railways between Antwerp and the Rhine has, within these few days, been opened to the public. Hamburgh, justly alarmed, is negotiating with Hanover on one bank of the Elbe, and with Prussia on the other, to secure a Railway through one of those kingdoms into Saxony, Bavaria, and Bohemia, which will not merely advantage her present trade, but bids fair to divert to Hamburgh the commerce of Trieste, for the supply of central Germany with colonial produce and manufactures.

"France has tried the experiment successfully near Lyons; and the government have publicly declared they will become partners in the lines now in progress from Paris to the coast. Even in Austria there are two very extensive lines of Railroad at work.

"It is, however, in the United States where the greatest impulse has been given to Railways. Many hundred miles are already executed, and vastly more are in contemplation.

"In the small State of South Carolina, a Railway of 150 miles, in one continued line, is in actual operation. The whole population of that state is scarcely 300,000 souls; wages are 5s. a day, and capital at 7 per cent. interest; yet private enterprize chiefly has executed this great line, which is now, by its success, proving practically the truth of the principle long established in the minds of persons competent to judge, that Railways create their own sources of revenue.

"It seems incredible, that in Ireland, with a population of 8,000,000, multitudes of them in beggary, and too often in starvation from want of work, with wages at from four pence to one shilling a day, and money at four per cent., one short Railroad alone has yet been executed.

"However philanthropists and politicians may differ about many of the causes of the sufferings of the Irish poor, however various the proposed remedies, all unite in declaring that want of employment for the laboring classes is the leading evil, requiring the application of an immediate remedy; and all experience shows that an expenditure of money on public works has invariably introduced comfort and peace to the destitute and disturbed districts, and has increased the public revenues of the country in direct proportion to the amount of money expended. Public works, the effects of which have the great value of improving and increasing internal intercourse, trade, and manufactures, must be the most desirable of any, and more so, when their ultimate tendency will be to combine facilities for foreign communication, and particularly those of a commercial nature.

"Such public works are Railways, the new means of communication on land by steam; a power which on water has already been so highly beneficial to Ireland.

"Carrying the line to an ultimate *terminus* at Valentia Harbour, on the very verge of the Atlantic Ocean, the undertaking ceases to be considered in a local point of view, and becomes a great national work, in which Great Britain, Europe, and the Americas would be as much interested as Ireland. We should, in fact, have arrived at a port which nautical men, statesmen, and many acute inquirers, have at various times, and under different circumstances, and without communication or connexion with, and even without knowledge of each other, recommended as the most eligible harbour for the foreign arrivals and departures of the United Kingdom.

"The attention of the Government has often been called to the eligible situation of Valentia Harbour, and the highest naval authorities have given evidence to Parliament of the peculiar combination of advantages which it possesses as a packet station. Captain Beaufort, R. N.; and hydrographer to the Admiralty, states, that 'the first object of all vessels, bound either to America, to the south of Europe, or Indin, is to get far enough out of the Channel to be able to adopt either tack without fear of the land; the next object is, to fetch to the westward of Cape Finisterre.' By sailing from the harbour of Valentia, the most westerly port in Europe, both these objects are secured. Captain Beaufort further states, that 'whenever possible, a packet harbour should have two ways of exit, like Spithead, for instance.' Valentia Harbour possesses this advantage, having too easy practicable inlets to an excellent receptacle for shipping, capacious, safe, land-locked.

"The intervening transit between Valentia (the nearest point of land in Europe to America) and the harbour of New-York is unobstructed by islands, rocks or shoals; and the distance being less than 2700 miles, may be traversed by steam packets, such as those now running between Kingstown Harbour and Liverpool, in ten or twelve days. London will thus be brought within a fortnight's distance of the Canadas and the United States. Liverpool may be reached, on the completion of the English Railway, in ten hours from London; the average passage (looking forward to no increased speed in steamboats) from Liverpool to Kingstown in fourteen hours; and by this proposed Railway of 200 miles from Kingstown Harbour to Valentia Harbour, the run across Ireland would be made in ten hours. In all 34, or at most 36, hours from London to the shores of the Atlantic; and on great emergencies, and with a favorable water passage, it may be reduced to 26 hours. The fact is almost incredible, but it is undeniable.

"If, as stated by Captain Beaufort, 'the establishment of a post office packet station at Valentia would insure a saving of four or five days in the voyages of sailing vessels,' can it be doubted, that with such a ready connexion with London, Valentia Harbour will not be the great outport of the United Kingdom, and (passing rapidly over the chain of intermediate reasoning) of France and all northern Europe. In short, Ireland would become the great highway of nations from the Old to the New World."

* Stockton and Darlington and Branches 40 Miles.
Liverpool and Manchester..... 32 "
Railways near Glasgow, and Branches.. 25 "
Leeds and Selby..... 25 "
Dundee and Newtyle, N. B..... 12 "
Hotten Railway, &c..... 10 "
St. Helens and Runcorn and Branches... 12 "
Wigan and Newton and Warrington..... 14 "
Clarence Railway..... 30 "
Edinburgh and Dalkeith ..... 10 "
Canterbury and Whitstable..... 8 "
Seaham Railway..... 7 "
Bolton, Leigh and Kenyon..... 10 "
And several others.

† London and Birmingham..... 112 Miles.
Grand Junction..... 80 "
London and Southampton..... 80 "
Newcastle and Carlisle..... 60 "
Preston and Wyre..... 18 "
Bolton, Bury, and Manchester and several others ..... 15 "

‡ London and Bristol 125 miles, and four or five others.

§ London & York, Cambridge & Norwich 280 Miles.
London, Ipswich and Yarmouth..... 120 "
Edinburgh and Glasgow..... 50 "
London, Brighton and several others..... 50 "
London and Greenwich..... 34 "

VALUE OF RAILROADS.—The question is well put, by the editor of the Boston Daily Advertiser, "whether Railroads, independent of their income to stockholders, are to be regarded as a public improvement?"—The truth will, ere long, be more generally admitted, that, in most cases, however profitable the road may be to the stockholders, it is still more profitable to the community; especially to that portion who *travel*; have goods or produce to transport, or own property in its vicinity. The stockholders, in *that capacity alone*, are the least benefitted of any portion of the community, however large may be their dividends.

THE LOWELL RAILROAD.—We copy the following statement from the Lowell Courier. The reader may judge from it whether the Railroad, independently of its income to the proprietors, is to be regarded as a public improvement. The number of passengers who travel on this Railroad, will probably average 500 daily. The usual speed is something less than the rate here stated, but the average length of a passage is but a little over an hour. The average time which was required, before the opening of the Railroad, for making the passage, was not far from five hours. To say nothing of the saving of money to those who travel on this route, is it no public advantage to make a saving in time of four hours to 500 persons daily? Is it not easy to imagine that business is expedited, and the public good promoted, as well as the ease and convenience of individuals, by this saving of time?

"*Railroad.*—The train we understand, came up from Boston, Tuesday forenoon, in *fifty-five minutes*, including the stop at the half-way place. Allowing for that stop 3 minutes, it travelled at the rate of thirty miles an hour, for the whole distance! The engine was a new one, made in Lowell."

We find in the Boston Daily Advertiser a notice of "a meeting held at Medfield, on the 10th inst. of gentlemen interested in the project of a Railroad from Dedham, through Medfield, Medway, &c., to Woonsocket Falls. A committee of three persons from each town on the route, was appointed to obtain information and report at an adjourned meeting. An improvement which will unite the population and manufacturing establishments of the flourishing villages in that direction more immediately with this city, will be of great utility, as well to the city as to them, and we shall be happy to see the enterprise successful."

RAILROAD FROM CLEVELAND TO CINCINNATI.—A correspondent of the New-York Mercantile Advertiser, states that there is a project on foot for the construction of a Railroad from Cleveland, via Columbus, to Cincinnati. The distance is about 250 miles, and it is calculated that the whole distance may be travelled in twelve hours instead of the time now occupied by stage, being from three to four days. The writer says, "this enterprise is one of vast magnitude for a *new country*, but it has been undertaken by such men as have never been known to leave a work, when once commenced, unfinished; and if enterprise—public spirit—wealth and perseverance are any guaranty, for the completion of such a work, then may we congratulate ourselves in having an abundant supply of each of these commodities, and in the full prospect of success." The capital stock is about four millions of dollars.

We find the above paragraph in the Buffalo Commercial Advertiser, but of the circumstances detailed in it we know nothing.—[ED. R. R. J.]

☞ Since the above was in type, we have received the Cleveland Daily Herald, which contains the proceedings of a meeting at that place in relation to the work, to which we shall refer in our next.

The Louisville Journal says:—

"On the 5th inst., a bill for the extension of the New-Orleans and Nashville Railroad into Tennessee, passed the Senate of that State, by a vote of 19 to 2, in the form in which it was originally reported. It had previously passed to a third reading in the House of Representatives, with an amendment, providing, that the Road should be taxed as fast as finished."

It is surprising that the members of the Legislature of Tennessee should attempt to clog, or throw obstacles in the way of, such a work as the New-Orleans and Nashville Railroad.

The Auburn Journal says:—

"It will be gratifying to our readers to learn that the work upon the Auburn and Syracuse Railroad is already commenced near Eldridge; and that sections 3 and 4 (about three miles east of this village) will be commenced to-day: and that it will be crowded throughout the whole line as fast as the season will permit."

And we say, before this shall be completed, another from Auburn to Seneca Falls, Geneva, Canandaigua and Rochester, will be commenced—as we infer from the following paragraph, from the same paper:—

"At a Convention of Delegates, held at Geneva, on the 16th day of November, 1835, in pursuance of resolutions passed at Canandaigua, on the 9th day of November instant, for the purpose of adopting measures to procure a charter for the construction of a Railroad from Auburn, through Seneca Falls, Waterloo, Geneva, Vienna, Manchester and Canandaigua, to Rochester."

Delegates were in attendance from Munro, Ontario, Seneca and Cayuga counties. The Convention was organized by the call of NATHANIEL W. HOWELL, of Canandaigua, to the Chair, and the appointment of SAMUEL CLARK, of Waterloo, and JAMES A. GUERNSEY, of Pittsford, Secretaries.

Several resolutions were adopted, and a committee of correspondence appointed for the purpose of promoting the object of the Convention.

The friends of this work may look forward to the success of the work under consideration with the utmost confidence. It is one of those works which are as sure of success as that the wheels of time will continue to roll for a few years longer. It will also be continued east from Syracuse. From Rochester one is now progressing rapidly towards the "*City of the Lakes*;" and it will not, at the farthest, exceed *five* years before there will be a continuous road from Albany to Buffalo; and we congratulate those who have been active in the business, that the prospect of early success is now so fair.

The Baltimore Chronicle says:—

"At a very numerous meeting of the citizens of Baltimore, called upon a requisition to that effect by the Mayor of the city, on Thursday, the 19th November, on motion, Gen. SAMUEL SMITH, Mayor of the city, was called to the Chair, and BENJ. J. COHEN and JOHN KETTLEWELL, appointed Secritaries.

"The chairman, in a few brief remarks, stated the object of the meeting, and caused to be read the proceedings of the meeting held at Brownsville, in Pennsylvania, urging a convention in that town on the 25th, with a view to the early completion of a Railroad from Cumberland to the Ohio river, and to which his attention had been called by the Committee of Correspondence, in a letter communicating the proceedings at Brownsville, published in the Chronicle of Monday last."

The meeting was addressed by Mr. C. F. Mayer, who closed by introducing some spirited resolutions, which were unanimously adopted. And a delegation of thirty, including the chairman, was appointed to attend a meeting at Brownsville, Pa., on Wednesday, the 25th day of November, to be formed of delegates from the towns, cities, counties, districts and states, that may find it convenient to be represented therein, and that feel an interest in the construction of said Railroad, and of such other works of national character as may advance the welfare of Maryland and her sister States—for the purpose of considering and adopting such measures as shall seem most likely to insure the early completion of said Road, and the construction of such other works.

Another meeting was held, of the citizens of Baltimore county, at Ellicott's Mills, on the same day, for the purpose of approving of the measure of a convention, and to appoint delegates.

Thus it will be seen that the friends of internal improvement in Pennsylvania and Maryland are moving in the great cause—and we most cordially bid them God speed—believing, as we do, that the resources of the West, which are being so rapidly developed, will furnish business for all the works of communication that the people will make.

Ohio is also stiring, as will be seen by the annexed paragraph from the Ashtabula Sentinel of the 14th inst.

"RAILROAD CONVENTION.—In pursuance to previous notice given to those friendly to the construction of a Railroad from some eligible point on Lake Erie, within the limits of the counties of Geauga and Ashtabula, to the Ohio river in Columbiana co. to assemble in convention at Warren on the 6th day of November, A. D. 1835, a meeting convened at 11 o'clock A. M. of said day."

The object of this convention appears to have been, to adopt such measures as will insure the commencement of operations on what was chartered in January, 1832, under the title of the Erie and Ohio Railroad, the charter of which, it appears, has become void, inasmuch as the stock necessary to organize, 2000 shares, has not been subscribed.

Measures are to be taken to obtain its revival, by an extension of the period for obtaining the subscriptions of stock.

HUDSON AND DELAWARE RAIL ROAD.—On Monday last, Mr. Jarvis, and the other Engineers, who have been for some two or three weeks past exploring the route of the Hudson and Delaware Rail Road, commenced surveying in our neighborhood to ascertain the most advantageous route to be pursued from the river. The rise at this village can easily be surmounted at several places, either at the north or south, without the aid of a stationary engine. We learn that it is the intention of the company to have their surveys in this region completed so as to be able to let out contracts as early as practicable in the spring.—[Newburgh Gazette.]

The number of travellers on the Boston & Lowell railroad, is 500 daily. The distance is twenty-five miles, and the time usually occupied in passing from one place to the other is generally but little more than an hour. One day last week the train ran through in fifty-five minutes including one stop. The time saved to each passenger by the railroad over the previous methods of conveyance, is four hours, amounting on "the ten hour system" to two hundred days.—[Jour. of Com.]

RAILROAD DISASTER.—Yesterday afternoon, while the two trains of cars belonging to the Baltimore and Susquehanna Railroad were on their return to this city, one from Timonium and the other from Owing's Mills, owing, as is supposed, to the inattention of the drivers, the two trains came in contact at the conjunction of the two branches, about six miles from the city. The consequence was, a most violent concussion, causing both trains to bound from the tracks, thereby injuring several of the passengers. One gentleman in particular was very much injured.—[Balt. Patriot.]

CANAL INTELLIGENCE.

It will hereafter be our aim to give a short summary of all the various Canals, as notice may be taken of them by the newspapers in their immediate vicinity, by which means our readers will have some idea of their progress and prospects; and from which, we trust, good will result to the cause of Internal Improvements throughout the country.

The same course will be pursued in relation to Railroads.

In the Cumberland Advocate, says the National Intelligencer, we find the following notice of the result which the location of the Chesapeake and Ohio Canal through that town, will produce there:

"The Canal Basin is to be formed about one hundred yards below the Chain Bridge, a little to the left of the mouth of Will's Creek, at the Western end of Hoblitzel's and Hoy's Island. It takes a narrow strip off the lots now owned and occupied by Messrs. H. Wineow, M. Fisher, J. Shriver, S. Charles, A. Russell, M. Rizer, jr., G. G. Wineow, and D. Shriver, who have given the right of way.

"The dam to be constructed at Beall's Island, about one mile below the town, will back the water, it is said, as far up Will's Creek as the old market house, which is near the centre of the town, forming all the way a canal or basin sufficient to transact any amount of business required. It is also to back the water in the Potomac to a point near two miles above, or southwest of the town, which will join Will's Creek at its mouth (as the river now does) and join the basin by a *guard* lock.

"The whole, when completed, will form a splendid Basin of about *four miles* long, and between a half and a quarter mile wide. It will present more the appearance of a Lake than a Basin, and will be competent to hold more than ONE THOUSAND Canal Boats at the same time—and as one of our townsmen remarked a short time since, 'it will afford pleasure boats with sail—steamboats, coal boats and trade boats; and will be a place of general resort for fishes and water fowl of every description.'

"It may be said of Cumberland that she is rising. Nothing can now prevent it. Her situation is healthy and romantic. She has, or soon will have, one of the most splendid Canals in the United States, leading from her centre eastward to the Metropolis of the Nation—thence to any port in the world. And leading from her centre westward, there is an unrivalled Macadamized Road, which is destined to convey to her depots a large portion of the Western Trade."

There is no work of the kind now under consideration more deserving of attention, than the NIAGARA SHIP CANAL. The following article, in relation to this contemplated work, is from the CHICAGO AMERICAN. We wish it could be read by every *true son* of this Union, and that he could at the same time *justly* appreciate the importance of the work.

To us, who have for years devoted so much time to the consideration and importance of a more extended scale of Internal Improvements, argument to establish its necessity seems superfluous; yet we are aware that others have their doubts as to the policy of pushing such works, especially if the State is to furnish the whole, or a part, of the means, to the extent desired by us. In this we doubt not their honesty—yet it does appear that, so long as the expenditure tends to increase the value of every man's property, and a sufficient revenue at the same time is derived from the works, not only to pay the *interest*, and *repairs*, but also eventually to liquidate the original outlay, there must be a great want of foresight and liberality, or intelligence, in those who cannot be convinced.

NIAGARA SHIP CANAL.—No improvement of a national character so eminently deserves the attention of the people of the Western States, as the proposed Ship Canal around the Falls of Niagara. Those States that border upon the great Western Lakes, or that are, or may be connected with them by natural and artificial navigable communications, have a deep interest in the prosecution of this work. It will remove the barrier that is now only in part surmounted by the Welland Canal, and open a safe, cheap and convenient communication between the upper and lower Lakes, within the Territory of the United States, and enable the West to conduct her commercial operations independent of our British neighbors. It will also enable us to approach *one hundred and sixty-one miles* nearer to the city of New-York with vessels of the largest class navigating the Lakes, insure certainty, increase the speed, and reduce the cost of transportation.

The people of this State will derive immense benefits from this improvement, as the staple productions of the soil must and will seek the New-York market. When the Illinois and Michigan Canal shall be completed, and the Erie and Hudson Canal of New-York enlarged, so as to admit the passage of vessels of one hundred and twenty tons burthen, from Oswego on Lake Ontario to the Hudson River, as now contemplated, this route to the seaboard will combine more advantages than any other that can be obtained; for certainty, safety, and economy of transportation, so essential to all commercial transactions, will be secured, and the most advantageous market in the United States for the products of the West attained. Even now, without the proposed improvements around the Fall, and the enlargement of the New-York Canals, with only the imperfect facilities afforded by the Welland Canal, the rate of transportation on goods from New-York city to Chicago and other ports on Lake Michigan, by the way of Oswego, is considerably less than by the way of Buffalo; and our merchants here are able to save, by preferring the former to the latter route, from *twenty-five to seventy cents* per barrel bulk. This saving is owing to the superior economy of Lake over Canal transportation, and will be materially increased by the proposed Ship Canal.

* * * * * * *

No improvement of the same extent can be found that will benefit so large a portion of the United States at so little cost, or that will give so general and extensive facilities to internal commerce, as the one under consideration. As a means of national defence, this work demands the serious attention of Congress,—it will facilitate the transportation of troops and munitions of war, and hasten the rapid concentration of naval and military forces at important points along the great extent of our northern and western frontier.

The United States Engineers have just completed the survey of the several routes for this Canal. They consider the project perfectly practicable, and of much less expense than it has generally been estimated at, and far less than the great importance of the work would justify.

We may well consider, in connexion with this, the ILLINOIS and MICHIGAN CANAL. The people of Chicago, in their exertions to aid in pushing their great work around Niagara Falls, forget not—as they certainly should not—their immediate affairs.

We find in the American, of November 7th, a reference to, and an account of, the proceedings of a meeting held there on the 2d, from which we extract one or two resolutions showing the spirit of the people, and from such a spirit good must result. We need not say how much we desire to have that improvement, either as a Canal, or Railroad, commenced.

CANAL MEETING.—In another column will be found the resolutions passed at the Canal Meeting held in Chicago on Monday evening last. They are full and comprehensive, and must meet the approbation and response of every well informed citizen. They exhibit enlarged views of the subject of Internal Improvement, and call for immediate and *efficient action* in relation to the Illinois and Michigan Canal. We believe they spoke the sentiments of the great body of the people of this State.

Resolved, That the construction of the Illinois and Michigan Canal is an enterprise eminently calculated to raise the character of the State to a high standing abroad, to open to her citizens a navigable inland communication from the Gulf of Mexico to the Bay of New-York and the Gulf of St. Lawrence, embracing in its influence a large portion of the Union, bringing to their doors an extensive and ready market; opening an easy and direct communication between the Lakes and the fertile and extensive valley of the Mississippi, the most productive region of America, and calculated to contain a dense population, whose products and consumptions must at all times keep up a lucrative and active trade, "exciting the powers of productive industry, furnishing aliment and giving energy to external commerce—the riches it will create, the energies it will call into action, and the blessings it will produce, are so plain and obvious as to be beyond all question."

Resolved, That a meeting of the citizens of this town, be held at this place on the 11th day of November, instant, to consider what measures are proper to be adopted to co-operate with the citizens of other States in an application to Congress to open a Ship Canal between Lakes Erie and Ontario, round the Falls of Niagara.

The meeting then adjourned.

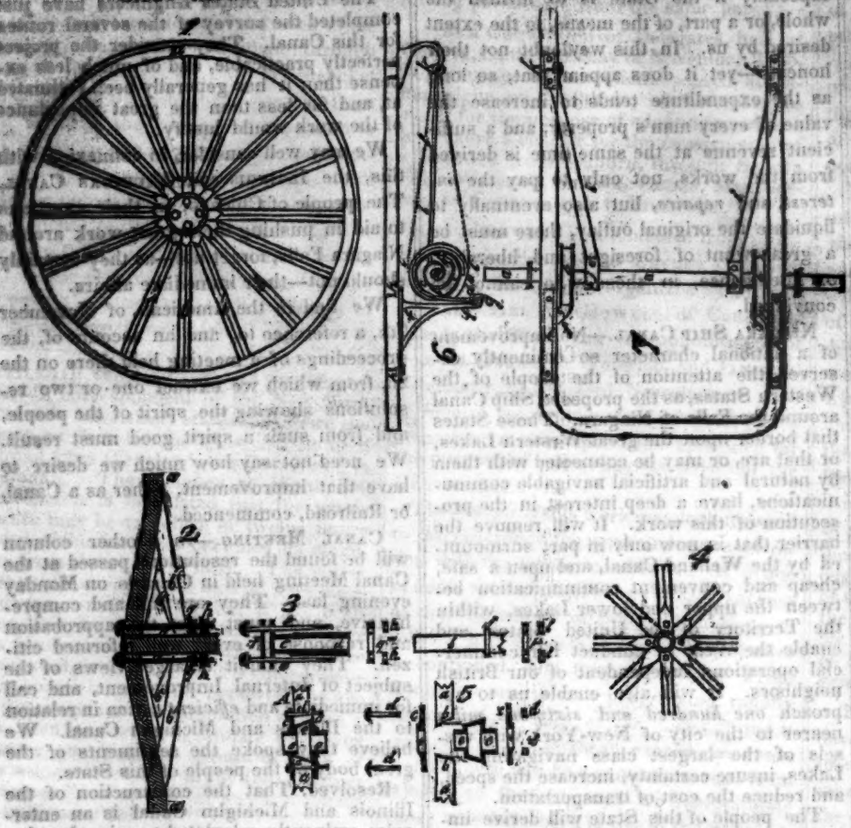
E. PECK, President.

B. S. MORRIS, P. T. TEMPLE, } Secretaries.

LAUNCH.—The new steamboat *New Jersey*, will be launched the latter end of this week, from the corner of Hudson and Essex streets. She is intended for the Jersey City ferry, and is the largest and finest ferry boat in the country, and will of course increase the accommodations on this ferry, already fully equal, if not superior, to those of any other in the United States.

The facilities of access to New York, by means of the Paterson and Newark railroads, have increased the travelling to such a degree as to render an additional boat necessary.—[Jersey City Gaz.

GIBBS' IMPROVEMENT IN CARRIAGES AND CARRIAGE WHEELS.



[From the London Repertory of Patent Inventions.]

Specification of the Patent granted to JOSEPH GIBBS, *of Kennington, in the County of Surrey, Engineer, for certain Improvements in Carriages and in Wheels for Carriages.*—Sealed November 4, 1834.

WITH AN ENGRAVING.

My invention of certain improvements in wheels for carriages consists in a peculiar arrangement of the spokes and naves of wheels, whereby wheels may be constructed with greater facility as will be hereafter fully described.

Description of the Drawing.

Fig. 1, represents a wheel constructed according to my improvements, which I prefer first to describe.

Fig. 2, is an edge view in section.

Fig. 3, shows the nave in section, which is of metal. This nave also constitutes the axletree box.

Fig. 4, shows part of a wheel in section in order to shew the arrangement of the spokes. In each of these figures, (1, 2, 3, and 4,) the same letters indicate similar parts, *a, a*, being the felloes of the wheel, there being mortices cut in them to receive the ends of the spokes, as is clearly indicated in the drawing at fig. 2. *b, b*, are the spokes which it will be seen stand at an angle to each other, and each two (proceeding from opposite ends of the nave) appear when the wheel is viewed edgeways to form the two sides of an isosceles triangle, of which the nave represents the base; but it will be seen that the spokes are inserted at equal distances from each other in the felloes, and they are alternately placed at the two ends of the nave, as is very clearly shown in fig. 2, and the ends of the spokes are slightly hollowed out in order to abut against the axletree box which constitutes the nave of the wheel. *c*, is a plate formed on the outer end of the axletree box, *d*. The spokes may be so formed at the ends which come against the axletree box, *d*, that they just fill in and wedge one another, as shown in fig. 4, or there may be longitudinal grooves cut or cast on the outer surface of the nave or axletree box. *e, e*, are screw bolts which retain the parts of the wheel together, and also hold the axletree within the axletree box, as will be hereafter fully described. *f*, is a washer which lies against the plate, *c*. It will be seen that the spokes, *b*, which project outward from the felloes come against the plate, *c*, and the spokes, b^1, which project inwards are retained in their position by the plate, *g*, and this plate is held to its proper position by the screw bolts, *e, e*, by means of the nuts, *h*. The axletree, *i*, has a collar, *j*, formed thereon, and by means of the plate, *k*, the screw nuts, *l*, and the screw bolts, *e, e*, the axletree is held within the axletree box, *d*, as will be evident on inspecting the various figures in the drawing.

Having thus described the various parts of the wheel, when constructed according to my invention, it is necessary to point out more particularly the pecular novelty of the construction which constitutes the invention secured by the above recited letters patent. It will be evident, that as any two succeeding spokes, b, b^1, may be said to form the two sides of an isosceles triangle, the axletree box or nave, *d*, forming the base of such triangle, if the plate, *g*, be made to approach the plate, *c*, the spokes, b^1, will approach the spokes, *b*, that is to say, they will approach more nearly to the perpendicular, which will tend to expand the circumference of the felloes, and make the whole wheel most rigidly secure, and thus in case of the spokes becoming loose, the wheel may be made firm by merely screwing up the plate, *g*: and it may be remarked, that a wheel constructed according to these improvements, may be repaired in much less time, and at less expense, than when wheels formed in the ordinary manner, for it will only be necessary to remove the plate, *g*, sufficiently to take out any faulty spokes and replace the same with others and then to screw up that plate, *g*, and the wheel will be again complete.

Fig. 5, represents a different arrangement for expanding the spokes and felloes. The spokes which are shown edgewise and in part at *a, a*, are all placed in the same plane, and held in their places by the plates, *c, c*, and bolts and nuts, *d, d, d, d*. If the spokes were arranged so as to form a smaller cone at their interior end than that at the exterior of the box, *e, e*, it is evident that by screwing up the nuts on the bolts, *d, d*, the cone, *e, e*, would be forced through the conical hole formed by the spokes, and thereby push the whole of them outwards towards the felloe, and so produce an expanding action outwards. The box and spokes when screwed up would appear as at *a*, fig. 5.

Having thus described the nature of my invention of certain improvements in wheels for carriages, and the manner of carrying the same into effect, I would have it understood that I lay no claim to the various parts of a wheel, which are well known; but I do hereby confine my claim of invention to the arranging of the spokes so that they are capable of expanding out the felloes, and thereby offering great facilities in constructing as well as in reparing wheels so formed.

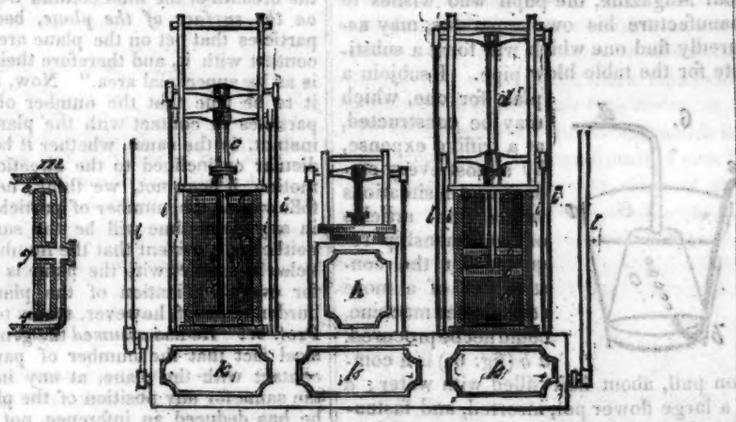
And further, as relates to my improvements in carriages, the same are ascertained and described by reference to the drawings.

Figs. 6 and 7, which represent such parts of a carriage as are necessary to explain my invention, the same letters of reference are applicable to both these figures. *a*, is the axletree of the carriage. *b, b*, is a box or barrel (shown at fig. 6, with one of its ends removed to exhibit the interior,) which contains a spiral spring, *c, c*, one end of which is attached to the axis, *a*, and the other to the box, *b, b*. The action and construction of this spring, therefore, is similar to the main spring of a watch. Round the preriphery of the barrel, *b, b*, is wound the leather strap, *d, d, d*, attached to the barrel at the point, *e*, and to the supporting rod, *f, f*, at *g*, which supporting rod is bolted to the shafts (or any convenient part of the carriage) at *h, h*. It is evident, therefore, that if weight be

added to the carriage, such weight will tend to depress the body of the carriage by pulling round the strap, *d*, *d*, and causing the box or barrel, *b*, *b*, to turn on the axis, *a*, and thus partially wind up the spiral spring, *c*, *c*. In the application of this invention I make use of two such boxes and springs as shown at fig. 7, and, thus arranged, the motion of the carriage will nearly correspond with that of a carriage with common springs. It will be evident, however, that in this arrangement some apparatus is necessary to prevent the axis from turning round, and also to prevent the carriage from rising and falling in an improper direction. This arrangement is shown at figs. 6 and 7, and may be thus described. Two flat bars of steel, *i*, *i*, are bolted at one of their ends to the flaps of the axis at *j*, *j*, and at the other (by bolts) to the knuckle joints, *k*, *k*. By this apparatus, when the carriage vibrates upon its springs it will describe a curve represented by the red line, *l*, *l*, fig. 6, being a segment of a circle of which the bars, *i*, *i*, are the radii, and the knuckles, *k*, *k*, the centre. The motion of the carriage, therefore, is nearly vertical, and sufficiently so for practical purposes.

Having now described the nature of my invention of improvements in carriages, I hereby declare that I claim as my invention as far as relates to my improvements in carriages, the application of a spiral spring and barrel, as a substitute for the ordinary springs of carriages, and the mode by which the axis is connected to the body of the carriage, viz., by the radius bars, *i*, *i*; and though the parts individually may have before been used in machinery, yet I claim the whole as a new combination, forming an improved substitute for the ordinary springs of carriages. In witness whereof, &c. Enrolled May 4, 1835.

NOBLE'S IMPRROVEMENT IN THE APPLICATION OF STEAM.



[From the Repertory of Patent Inventions.]

Specification of the Patent granted to WILLIAM ALFRED NOBLE, *of Cross Street, Cherry Garden Street, Bermondsey, in the County of Surry, Engineer, for certain Improvements in applying Steam to the common and other Engines.* Sealed December 4, 1834.

WITH AN ENGRAVING.

My improved steam engine consists in having two pistons in one cylinder, by which means the engine is enabled to make double the number of strokes it would do if it had but one piston, consequently double the velocity (or power) is obtained without the aid of multiplying wheels.

Description of the Drawing.

The annexed drawing is a representation of a perpendicular section of the cylinders for a pair of thirty-horse marine engines. *a*, the cylinder. *b*, *b*, the pistons. *c*, the hollow piston rod, with a stuffing box at the end, which admits of the piston rod to the lower piston passing through. *d*, the solid piston rod to lower piston. *e*, the steam port which admits the steam to act on the upper side of the upper piston, *b*. *f*, the steam port which admits the steam to act on the underside of the under piston. *g*, the steam port which admits the steam in the centre of the cylinder to enable it to act on the two pistons. *h*, the cistern which contains the air pump and the condenser. *i*, *i*, *i*, *i*, the connecting rods to the crank, *k*, by which the power of the two engines are united. *k*, the four throw crank, shown by the dotted lines running under the base of the cylinders and condensers. *m*, represents the steam ports above specified, as seen from the other side of the cylinders, and the steam is let on and off in the usual way. *l*, *l*, the connecting rods from the crank of the engine to the crank of the paddle wheels. The steam being admitted through the steam ports, *e*, and *f*, forces the pistons, *b*, *b*, together, the steam is then turned off into the condenser in the usual way, which is unnecessary to describe, at the same time the steam is admitted by the steam port, *g*, between the pistons, the one is then forced up and the other down: the above action is then repeated, which being connected to the cranks by means of the connecting rods, *i*, *i*, *i*, *i*, the machine or paddle wheel is set in motion.

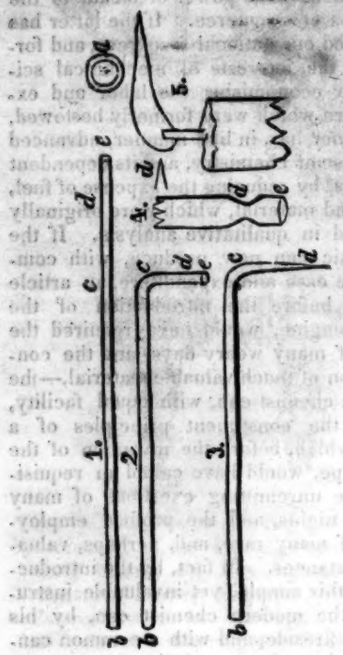
I would further observe, that I do not confine myself to the operation of two pistons in one cylinder, as more might be employed; but two appear to be sufficient. The same principle of two or more pistons in one cylinder is applicable to engines of high pressure principle. In witness whereof, &c.

Enrolled June 4, 1835.

[From the London Mechanics' Magazine.]

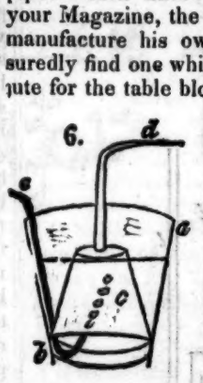
ON THE PRACTICE OF THE BLOW PIPE.—The introduction of the use of the blow pipe in practical chemistry, may be regarded almost in the same light as the application of the power of steam to the purposes of commerce. If the latter has increased our national resources, and forwarded the interests of mechanical science, by economising the labor and expenditure which were formerly bestowed, the former has, in like manner, advanced the cause of chemistry, and its dependent sciences, by reducing the expense of fuel, time, and material, which were originally required in qualitative analysis. If the mechanic can now produce, with comparative ease and expenditure, an article which, before the introduction of the steam engine, would have required the labor of many weary days, and the consumption of much valuable material,—the modern chemist can, with equal facility, detect the constituent principles of a body, which, before the invention of the blow pipe, would have called in requisition the unremitting exertions of many tedious nights, and the profuse employment of many rare, and, perhaps, valuable substances. In fact, by the introduction of this simple, yet invaluable instrument, the modern chemist can, by his parlour fireside, and with a common candle, perform those operations, to accomplish which, the ancient and less gifted philosopher would have been compelled to resort to the unhealthy atmosphere of a laboratory, and the continued poring over an intensely active fire. The blow pipe, according to Bergman, had been long employed in the arts by jewellers and others, for the purpose of soldering, before it was applied to the purposes of analytical chemistry and mineralogy, by a Swedish metallurgist, of the name of Sual, about the year 1733. This individual, however, appears to have left no written account of the method which he adopted in the application of this instrument. The researches of Cronstedt, Bergman, and Gahn, and, more recently, those of Berzelius and Faraday, have concurred in raising this instrument to the eminent station of utility which it at present enjoys. In the work of Berzelius on this subject, will be found ample instructions for the pursuit of mineralogical and analytical chemistry; and in the "Chemical Manipulations" of Dr. Faraday, the student will meet with copious directions for applying this instrument in the bending and blowing of glass, in practical chemistry. For the former purpose, the mouth blow pipe possesses undeniable advantages; but for the more fatiguing operations of the latter, the table, or hydrostatic, blow pipe will be found conve-

nient. The advantages possessed by the mouth blow pipe over all those instruments whose blast is produced by artificial means, consists in its portability, economy, and the facility of immediately suspending or modifying the blast. "The chemist does not possess," says Dr. Faraday, "a more ready, powerful, and generally useful instrument, than the mouth blow pipe, and every student should early accustom himself to its effectual use and application."



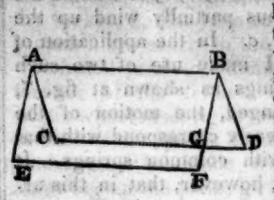
The supply of a *continued* stream of air, is the chief difficulty which a beginner experiences in learning the use of this instrument, and this difficulty is, I apprehend, not unfrequently increased by the employment of a blow pipe with too large an orifice, in the first instance. The following method of constructing, will, I have reason to believe, be found more efficacious than any other hitherto published, since I have, by its means, succeeded, in less than half an hour, in communicating the art of blowing to a class of several persons. Let the pupil procure a tube of glass, *b e*, about thirteen inches long, and of the size and thickness of *a*. Let him now thoroughly heat the tube at *e*, about two inches from the end, by slowly turning it round in the flame of a candle, or, what is better, a spirit lamp. When he finds that it will yield, let him bend it gradually till it has acquired the position represented by fig. 2. The part *d* is now to be heated in the same manner, till it is found soft enough to draw out, when the part *e* must be gradually withdrawn, as represented in fig. 4, till it terminates in a point; this point should be held for a minute or two in the point of the flame, in order to thicken it, and when cold it is to be ground away with a file, until the smallest possible orifice is visible. The pupil will now be possessed of a blow pipe (fig. 3,) with an exceedingly minute jet; and if he puff out his cheeks to the utmost, and place the end *b* within his lips, while the other extremity is held within a short distance of a candle, (fig. 5,) he will, after a few trials, find no difficulty in keeping the flame *continually*, and *without intermission*, horizontal and clear. The operation which he will be required to perform, in order to keep his cheeks constantly distended, notwithstanding the escape from the jet, cannot easily be described, but will naturally offer itself when the expenditure of air is very small. When the pupil has succeeded in keeping up a constant blast for several minutes, by this means, he may enlarge the aperture by degrees, practising between each enlargement, till he finds he can manage a blow pipe with a large bore, when he should purchase one of brass, with an ivory or tinned mouth piece, for general use.

Among the numerous hydrostatic blow pipes which have already appeared in your Magazine, the pupil who wishes to manufacture his own apparatus, may assuredly find one which will form a substitute for the table blow pipe. I subjoin a plan for one, which may be constructed, at a trifling expense, by almost every student, and in situations where the articles of workmanship requisite for the construction of a more complicated machine, could not be procured. *a b* (fig. 6,) is a common pail, about half filled with water; *c* s a large flower pot, inserted, and fastened in by any convenient method; *d* is a mouth blow pipe, (glass would do on an emergency,) fastened in air tight, with a cork and lute, to the hole at the bottom of the flower pot; *e* is a bent tube of glass, or metal, terminating under the mouth of the flower pot. When air is blown in from the mouth at *e*, it rises into the body of the internal vessel, and displaces the water, which, in endeavoring to regain its level, forces out the air from the jet of the blow pipe, with a force proportioned to the height of the column of water displaced.



On the Resistance of Fluids; by Geo. W. Keely, *Professor of Natural Philosophy, in Waterville College.*

Sir,—I perceive in No. 55 of the Journal, that Professor Wallace has announced a new measure of the resistance of a fluid in a direction perpendicular to a plain surface moving in it, viz: That it is as the sine of the inclination of the plane. Permit me to state my reasons for adhering to the old doctrine, that the perpendicular resistance is as the square of the sine of inclination. It is well known that the latter measure has been deduced from the alleged facts that the *number* and the *force* of the resisting particles vary as the sine of the inclination. If it be true that the resistance to a plane surface moving in a fluid is as the number of particles it strikes in its course, and that the number of particles in any indefinitely thin fluid lamina is as the area of that lamina, (neither of which we think Professor W. will deny,) it follows that, if BD be a section of a plane inclined to the direction BA of its motion, and BF an equal section of an equal plane perpendicular to the same direction, the number of particles BD will strike is to the number that BF will strike in the same time, as the parallelogram ABCD is to the parallelogram AEFB; and the resistances are therefore, on this account, as BG is to BD, or as the sines of the inclinations of the sections; the resistances to the planes are of course in the same ratio.



Now this familiar demonstration would seem to settle the question; but Professor Wallace argues, "that the number of particles striking the plane does *not* depend on the breadth of the fluid column BG BF, but *on the surface of the plane*, because the particles that act on the plane are those in contact with it, and therefore their number is as its superficial area." Now, admitting it to be true that the number of material particles in contact with the plane, at any instant, is the same, whether it be perpendicular or inclined to the direction of the motion, it does not, we think, necessarily follow that the number of particles struck in any given time will be the same. But neither is it evident that the number of particles in contact with the plane is the same for every inclination of the plane. The burden of proof, however, seems to lie with Prof. W. He has *assumed* the general physical fact that the number of particles in contact with the plane, at any instant, is the same for any position of the plane, and he has deduced an inference, not formally expressed, indeed, but surely implied, otherwise the argument is worth nothing, that the number of particles struck in any given time is as the number in contact with the plane at any instant. Now we think the fact and conclusion may very safely be denied, and it becomes Prof. W. to show that they are consistent with some hypothesis respecting the form and relative position of the ultimate particles of a fluid body. In any hypothesis, we believe the following positions will be found to hold:

First. Whether the number of particles, at any instant, in contact with the plane, in different positions, is the same, depends wholly on the hypothesis.

Second. If the number is the same in different positions, it will be found that the number of fluid strata struck in any given time, is as the sine of the inclination.

Third. If the number is *not* the same, then it varies as the sine of the inclination, and the number of strata struck will, in any given time, be the same.

If Prof. W. can devise any hypothesis with which these positions do not agree, we will allow he can disturb our belief in the truth of the law of the square of the sines.

The wide difference between the results of observation and those of the old theory, would tend rather to dissuade us from admitting the truth of the new, when we consider what important physical circumstances are and must be omitted in the conditions.—[Silliman's Journal.]